Field to Market®

RICE: SUSTAINABILITY INDICATORS

Understanding Rice Trends in Field to Market's 2021 National Indicators Report

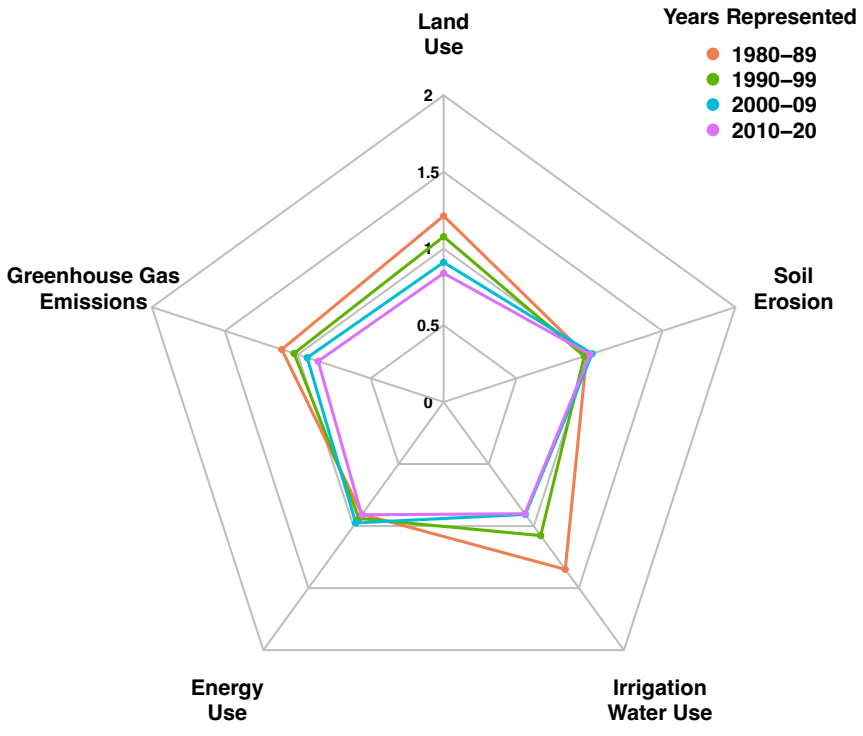
Field to Market's 2021 National Indicators Report – *Environmental Outcomes from On Farm Agricultural Production in the United States* – analyzes sustainability trends from 1980-2020 at the national scale for 11 commodity crops. Released every five years since 2009, the fourth edition of this peer-reviewed report analyzes trends over time in sustainability performance for U.S. commodity crop systems, providing a critical assessment of where U.S. agriculture has made progress in driving improved environmental outcomes, and where additional efforts are needed to advance industry-wide sustainability goals.

Use this factsheet to explore key findings from the report for Rice, identifying trends in Land Use, Irrigation Water Use, Energy Use, Greenhouse Gas Emissions (GHG) and Soil Erosion. Explore the full findings and learn how to properly cite the 2021 National Indicators Report at www.fieldtomarket.org/Report.

KEY FINDINGS FOR RICE

Rice is primarily grown in two regions of the United States – the Sacramento-San Joaquin Delta region of California and the Mississippi River valley states of Arkansas, Louisiana, Mississippi, Texas, and Missouri. Rice is typically grown under flood irrigation and it was assumed all rice is irrigated for this study.

This figure illustrates the difference in the average indicator value for each decade and demonstrates clear improvement over time in Land Use and GHG Emissions with no change in Soil Erosion or Land Use and improvements in Irrigation Water Use up to 2010. Smaller values, closer to the center of the figure, represent a smaller environmental impact and more sustainable production of rice.



Indicator averages for 1998-2002 used to scale data for display on radar chart

Indicator	Value	Units
Land Use	0.0164	Planted Acres Per cwt
Irrigation Water Use	0.451	Acre-inches Per cwt
Soil Erosion	1.98	Tons Soil Loss Per Acre
Energy Use	146,000	BTU Per cwt
Greenhouse Gas Emissions	178	Pounds of CO_2 Eq. Per cwt

The table below provides the value for each indicator at the beginning of each decade (estimated from a fitted trend line).

Year	Land Use	Irrigation Water Use	Energy Use	Greenhouse Gas Emissions	Soil Erosion
	Planted Acres Per cwt	Acre Inches Per cwt	BTU Per cwt	Pounds of CO_2e Per cwt	Tons of Soil Loss Per Acre
1980	0.0221	0.66	142,526	218.9	2
1990	0.0182	0.5351	129,139	183.8	1.9
2000	0.0162	0.4379	144,325	176.2	2
2010	0.0141	0.4041	139,938	159.2	2
2020	0.0135	0.3915	121,193	146.8	1.9

- The Land Use efficiency indicator demonstrates increases in yield, showing improvement throughout the study period until decreasing in recent years.
- Irrigation Water Use efficiency for rice has also improved across the study period, with the greatest improvement occurring from 1980-2010.
- Energy Use efficiency for rice production improved in the 1980s and the 2010s but decreased in the 1990s.The largest energy component for rice is fertilizer use, followed by irrigation. Increases in the amount of fertilizer applied are largely driving the increased energy use.
- GHG Emissions per unit of rice production declined through the 1980s, plateauing through the 1990s, then continued declining after 2000. The primary component of emissions for rice is methane, consistently contributing over 80% of GHG emissions, which results from anaerobic (low oxygen) soil conditions in flooded fields. GHG emissions have declined on a per bushel of production basis due to increasing crop yields.
- The Soil Erosion indicator shows generally static, low levels of erosion throughout the study period. Rice is produced on flooded fields which are managed to have little to no slope in to retain water. As a result, rice fields are generally less susceptible to soil erosion.

While substantial progress has been made since 1980 in the yield and efficiency of rice production, the National Indicators Report highlights some areas to focus on to encourage and incentivize adoption of conservation practices that will lead to continuous improvement across the environmental indicators.

Field to Market: The Alliance for Sustainable Agriculture brings together a diverse group of grower organizations; agribusinesses; food, beverage, restaurant, and retail companies; conservation groups; universities; and public sector partners to create opportunities across the agricultural supply chain for continuous improvement in sustainable agriculture. Field to Market offers America's food and agriculture industries an essential tool for unlocking shared value for all stakeholders—a common framework for sustainability measurement that farmers and the supply chain can use to better understand and assess environmental performance. Together, Field to Market and its members work to collectively meet the challenge of producing enough food, feed, fiber and fuel for a rapidly growing population while conserving natural resources and improving the ability of future generations to meet their own needs.

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